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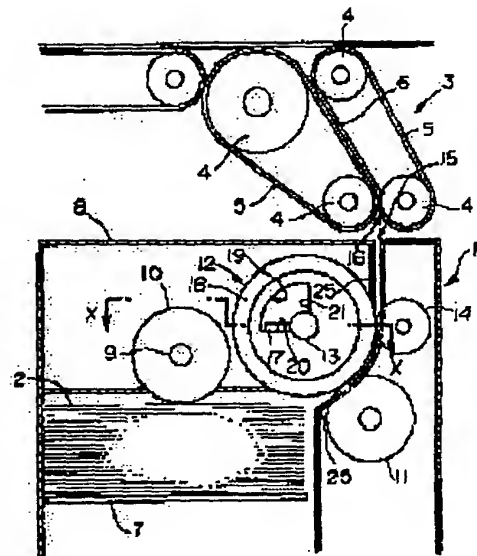
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## (54) PAPER SHEET FEEDING DEVICE

### (57)Abstract:

**PURPOSE:** To provide a paper sheet feeding device which prevents a paper sheet from being pulled by a large force between a transport mechanism part at high speed and a feeding roller at low speed and drives out a paper sheet always in a stable manner.

**CONSTITUTION:** A projection part 17 which projects outward in the radial direction is formed on a driving shaft 13 for driving a feeding roller 12, and on the feeding roller 12, a high frictional part 18 for generating a high frictional force is formed on the whole periphery of the outer peripheral part, and a nearly fan-shaped recessed part 19 which transmits the driving force of the driving shaft 13 to the feeding roller 12 by the contact of the edge surface 20 on the top edge side in the revolution direction, with the projection part, and sets the driving-out roller 12 free for the driving shaft 13 in the state free from the contact with the projection part 17 is formed.



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**CLAIMS**

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[Claim(s)]

[Claim 1] In the paper leaf delivery equipment which has the delivery roller which is formed in the conveyance direction preceding paragraph of the conveyance mechanism section which draws and conveys paper leaf, and lets out paper leaf to the aforementioned conveyance mechanism section rather than the bearer rate of this conveyance mechanism section at a low speed The aforementioned delivery roller is supported by the driving shaft free [ rotation ]. to this driving shaft The lobe which projects in the method of the outside of the direction of a path is prepared. on the aforementioned delivery roller While the high friction section which generates high frictional force is prepared in the perimeter of the periphery section Paper leaf delivery equipment characterized by forming the crevice of the outline flabellate which frees this delivery roller to a driving shaft in the state where transmit the driving force of the aforementioned driving shaft to this delivery roller, and the aforementioned lobe is not contacted when the end face by the side of a hand-of-cut nose of cam contacts the aforementioned lobe.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the paper leaf delivery equipment which dissociates one sheet at a time and lets out the accumulated paper leaf.

[0002]

[Description of the Prior Art] In order to process counting of paper leaf, such as a bill, differentiation, etc., there are some which were indicated by JP,63-77929,U as paper leaf delivery equipment with which paper leaf took out this one paper leaf at a time from the stowage by which accumulation receipt was carried out, and was prepared in the conveyance direction latter part, and which it lets out to the conveyance mechanism section which conveys paper leaf. This paper leaf delivery equipment has the delivery roller with which the high friction section which generates high frictional force was prepared in a part of periphery section, and lets out paper leaf to the latter conveyance mechanism section in the high friction section of this delivery roller.

[0003] By the way, in order to perform exact differentiation processing and distribution processing of paper leaf, it is necessary to open and convey an interval between the paper leaf conveyed by the conveyance mechanism section, and the bearer rate of the conveyance mechanism section is made into high speed from the delivery speed of the delivery roller of paper leaf delivery equipment, and the method of pulling apart precedence paper leaf from consecutiveness paper leaf is adopted. Also in the conventional paper leaf delivery equipment mentioned above, when it sets up so that it may let out paper leaf until the conveyance force of the conveyance mechanism section is applied, and the conveyance force of the conveyance mechanism section is applied to paper leaf, the range of the high friction section As the low portion of frictional force contacts paper leaf, when it carries out high-speed conveyance of the paper leaf by the conveyance mechanism section smoothly from the high friction section of a delivery roller, an interval can be prepared between paper leaf.

[0004]

[Problem(s) to be Solved by the Invention] However, if the physical relationship of the high friction section of a delivery roller and paper leaf shifts in the case of the above-mentioned paper leaf delivery equipment The state where the back end side contacted the high friction section of a delivery roller in spite of having sent the nose of cam of paper leaf into the conveyance mechanism section arises. paper leaf between high-speed conveyance mechanism sections and low-speed delivery rollers It was pulled by the big force, the blemish was sufficient for paper leaf just by this, and the problem that breakage will arise arose.

[0005] Therefore, the purpose of this invention is offering the paper leaf delivery equipment with which paper leaf's can prevent being pulled by the big force, and can always send out paper leaf smoothly between high-speed conveyance mechanism sections and low-speed delivery rollers.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the paper leaf delivery equipment of this invention It is prepared in the conveyance direction preceding paragraph of the conveyance mechanism section which draws and conveys paper leaf. It is what has the delivery roller which lets out paper leaf to the aforementioned conveyance mechanism section rather than the bearer rate of this conveyance mechanism section at a low speed. the aforementioned delivery roller It is supported by the driving shaft free [ rotation ]. to this driving shaft The lobe which projects in the method of the outside of the direction of a path is prepared. on the aforementioned delivery roller While the high friction section which generates high frictional force is prepared in the perimeter of the periphery section When the end face by the side of a hand-of-cut nose of cam contacts the aforementioned lobe, it is characterized by forming the crevice of the outline flabellate which frees this delivery roller to a driving shaft in the state where transmit the driving force of the aforementioned driving shaft to this delivery roller, and the aforementioned lobe is not contacted.

[0007]

[Function] According to the paper leaf delivery equipment of this invention, the lobe of a driving shaft will transmit the driving force of a driving shaft to a delivery roller, where th hand-of-cut nose-of-cam side of the crevice of a delivery roller is contacted, this will be rotated, and the high friction section prepared in the

perimeter of a delivery roller by this will let out paper leaf to a conveyance mechanism section side. And if the nose of cam of paper leaf goes into the conveyance mechanism section, since the bearer rate of the conveyance mechanism section is more nearly high-speed than the delivery speed of a delivery roller, the conveyance mechanism section will draw paper leaf at high speed. The crevice of the outline flabellate which frees this delivery roller to a driving shaft in the state where a lobe is not contacted is formed in the delivery roller here. Since the direction of drawing in of the paper leaf by the above-mentioned conveyance mechanism section is a direction which makes a crevice estrange from a lobe When the conveyance mechanism section draws paper leaf at high speed, a delivery roller [ quicker than the rotational speed of a driving shaft ] The same bearer rate as the bearer rate of the conveyance mechanism section is made, and it will rotate, and even if it lets out paper leaf so that a predetermined interval may be opened between the paper leaf conveyed by the conveyance mechanism section, paper leaf is not pulled by the big force between high-speed conveyance mechanism sections and delivery rollers. And in order to free a delivery roller to a driving shaft by starting drawing in of the paper leaf by the conveyance mechanism section, even if paper leaf is in which position to a delivery roller, paper leaf is not pulled by the big force between high-speed conveyance mechanism sections and delivery rollers.

[0008]

[Example] The paper leaf delivery equipment by one example of this invention is explained below with reference to a drawing. The sign 1 in drawing shows the paper leaf delivery equipment of this example, and this paper leaf delivery equipment 1 is formed in the conveyance direction preceding paragraph of the conveyance mechanism section 3 which draws and conveys the paper leaf 2, such as a bill. here, the conveyance mechanism section 3 is \*\*\*\*\* (ing) the conveyance belt 5 wound between pulleys 4, and drives it by the motor which only one conveyance belt 5 does not illustrate, and its another side is direct by this drive — or — being indirect (state where paper leaf 2 was made to intervene) — it takes and carries out the surroundings By driving so that the contact section 6 of conveyance belt 5 comrades may move towards the direction of the upper left in drawing 1 in this example, paper leaf 2 is conveyed in the direction of the upper left by this contact section 6, and is conveyed leftward after that.

[0009] As for paper leaf delivery equipment 1, the ejection roller 10 with which the elevator 7 in which paper leaf 2 is carried in the state of accumulation, and which can be gone up and down is formed in casing 8, and fixed support was carried out on the support shaft 9 at the elevation direction side of this elevator 7 is formed. Here, it goes up and down an elevator 7 that what is located in the top side of the accumulated paper leaf 2 should always be contacted on the ejection roller 10 with predetermined contact force.

[0010] The separation roller 11 is formed in the predetermined position on the tangent by the side of the hand-of-cut (direction of counterclockwise rotation in drawing 1) nose of cam of the periphery soffit position of the ejection roller 10, and the delivery roller 12 is supported by the driving shaft 13 in the top predetermined position by the side of the ejection roller 10 of this separation roller 11 so that the peripheral face may be contacted to the peripheral face of this separation roller 11 by predetermined contact force. Moreover, the follower roller 14 is formed in the top predetermined position of the separation roller 11 so that the peripheral face may be contacted to the peripheral face of the delivery roller 12 by predetermined contact force, and this follower roller 14 is direct or a thing which paper leaf 2 is made to intervene, takes indirectly, and is carried out the surroundings by the drive of the delivery roller 12. And the opening 15 of casing 8 is formed above the contact position of the delivery roller 12 and the follower roller 14, this opening 15 is countered, and the lead-in section 16 which draws the paper leaf 2 of the above-mentioned conveyance mechanism section 3 is arranged.

[0011] The rotation drive of the above-mentioned driving shaft 13 is carried out in the direction of a counterclockwise rotation in drawing 1 by the drive motor which is not illustrated, and the pin 17 which projects in the method of the outside of the direction of a path and which is a lobe is being fixed to the predetermined position.

[0012] The delivery roller 12 is supported by the predetermined position of a driving shaft 13 free [ rotation ], and the high friction section 18 which the periphery section is made to generate predetermined high frictional force, for example, turns into it from rubber material etc. between paper leaf 2 has fixed to the perimeter. Moreover, the crevice 19 which makes an outline flabellate focusing on a driving shaft 13 is formed in the unilateral side of the near side in drawing 1 of the delivery roller 12, and the above-mentioned pin 17 is located in this crevice 19. Thereby, the driving force of a driving shaft 13 is transmitted in the ends side 20 and the state where can rotate now freely to a driving shaft 13 in the range to which a pin 17 is located among 21, and the pin 17 contacted the end face 20 by the side of the hand-of-cut nose of cam of a crevice 19, and a crevice 19 is rotated to this driving shaft 13 and on .

[0013] The ejection roller 10 is interlocked with rotation of the delivery roller 12, and a rotation drive is carried out. That is, since the pulley 22 is being fixed to the delivery roller 12, and the pulley 23 is being-fixed also to the ejection roller 10 and the belt 24 is wound between these pulleys 22 and 23, as shown in drawing 2 , if a driving shaft 13 rotates and the delivery roller 12 rotates [ a pin 17 ] in contact with the end face 20 by the side of the

hand-of-cut nose of cam of a crevice 19, the driving force will be transmitted with a belt 24, and the ejection roller 10 will rotate.

[0014] The separation roller 11 is for separating the paper leaf 2 which began to be kicked from the ejection roller 10. It is formed from material, such as rubber which can generate larger frictional force smaller than the frictional force of the high friction section 18 of the delivery roller 12, and paper leaf 2 and than the frictional force of paper leaf 2 comrades between paper leaf 2. At the time of a delivery operation, a rotation drive is carried out in the above-mentioned delivery roller 12 and this direction (the direction of a counterclockwise rotation in drawing 1 ). And since the frictional force between the overlapping paper leaf 2 is smaller than frictional force with the paper leaf 2 in contact with the delivery roller 12 and this when duplex delivery etc. occurs, the paper leaf 2 in contact with the delivery roller 12 will be sent along the conveyance direction with the driving force of the delivery roller 12, and the paper leaf 2 in contact with the separation roller 11 will be returned to an elevator 7 side with the driving force of the separation roller 11. In addition, the nose of cam of the paper leaf 2 which it was begun from the ejection roller 10 to kick casing 8 is drawn between the delivery roller 12 and the separation roller 11, between the delivery roller 12 and the follower rollers 14 is passed, and the guide 25 for leading to opening 15 is formed.

[0015] In addition, the speed of the tangential direction of the delivery roller 12 and the follower roller 14 turns into delivery speed of paper leaf 2, the traverse speed of the contact section 6 of the conveyance belt 5 of the conveyance mechanism section 3 is a bearer rate, and delivery speed is set as the part low speed according to the predetermined interval prepared between the paper leaf 2 which it let out rather than the bearer rate.

[0016] Order is explained later on below about the operation of the paper leaf delivery equipment 1 of this example of the above composition.

[0017] When instructions are issued to let out paper leaf 2, the conveyance mechanism section 3 will drive in the predetermined conveyance direction, and the rotation drive of the delivery direction (the direction of a counterclockwise rotation in drawing 1 ) and the separation roller 11 will be carried out for the driving shaft 13 of paper leaf delivery equipment 1 in the anti-delivery direction (the direction of a counterclockwise rotation in drawing 1 ).

[0018] The pin 17 fixed to this driving shaft 13 when the driving shaft 13 drove contacts the end face 20 by the side of the hand-of-cut nose of cam of the crevice 19 of the delivery roller 12, and, thereby, the delivery roller 12 rotates to a driving shaft 13 and one. On the other hand, the rotation drive of the ejection roller 10 connected with this by rotation of this delivery roller 12 through the belt 24 will be carried out at a predetermined ejection speed in the delivery direction.

[0019] The nose of cam will be drawn by the guide 25 between the delivery roller 12 and the separation roller 11, and what is located in the top side of the paper leaf 2 accumulated by rotation of this ejection roller 10 on the elevator 7 will be inserted in it (state shown in drawing 3 ).

[0020] When a driving shaft 13 furthermore rotates, paper leaf 2 Between the delivery roller 12 and the separation rollers 11, contacting the high friction section 18 of the delivery roller 12 in the delivery direction After sliding mostly, moving that there is nothing and the nose's of cam passing through between the delivery roller 12 and the follower rollers 14, it projects from opening 15, and results in the lead-in section 16 of the conveyance mechanism section 3 (state shown in drawing 4 ), and drawing in is started by the contact section 6 between both the conveyances belts 5 of the conveyance mechanism section 3.

[0021] Since the bearer rate of the above-mentioned conveyance mechanism section 3 is more nearly high-speed than the delivery speed of the delivery roller 12 and the follower roller 14, the conveyance mechanism section 3 will draw paper leaf 2 at high speed. The crevice 19 which frees this delivery roller 12 to a driving shaft 13 in the state where a pin 17 is not contacted is formed in the delivery roller 12 here. Since the direction of drawing in of the paper leaf 2 by the above-mentioned conveyance mechanism section 3 is a direction which makes a crevice 19 estrange from a pin 17 When the conveyance mechanism section 3 draws paper leaf 2 at high speed, the delivery roller 12 is movement of paper leaf 2, makes the same speed as the bearer rate of the conveyance mechanism section 3 quicker than the rotational speed of a driving shaft 13, and rotates (state shown in drawing 5 ).

[0022] When the above-mentioned paper leaf 2 separates from the delivery roller 12 and the follower roller 14 to the conveyance mechanism section 3 side, the force in which the delivery roller 12 rotates this to the delivery direction side of paper leaf 2 stops and acting. At this time, although the following paper leaf 2a is the midst of kick \*\*\*\* with the ejection roller 10 and is in the state where the nose of cam was already sent in between the delivery roller 12 and the follower roller 14, it is \*\*\*\*\* (ed) by rotation of the separation roller 11 to the delivery direction at an opposite direction, making an opposite direction rotate the delivery roller 12 to the delivery direction. In addition, in case the delivery roller 12 rotat s reversely, the ejection roller 10 interlocked with this will also be rotated reversely, and the following paper l af 2a will be returned good.

[0023] By the inverse rotation of the above-mentioned delivery roller 12, and mov ment by the side of the end face 20 of the pin 17 of a driving shaft 13 by which rotation is continued, when a pin 17 contacts an end face 20

(state shown in drawing 6 ), the driving force from this driving shaft 13 will get across to the delivery roller 12 again, this delivery roller 12 will rotate to the delivery direction side, and the following paper leaf 2a will be sent out (state shown in drawing 7 ). And an interval predetermined to between paper leaf which it lets out to paper leaf [ which this already let out to the conveyance mechanism section 3 side since high-speed conveyance of the paper leaf 2 already drawn by the conveyance mechanism section 3 while a delivery was performed to the conveyance mechanism section 3 of paper leaf of degree after delivery roller 12 rotates reversely as mentioned above 2a was carried out ] 2, and degree 2a will be opened.

[0024] By the above, even if it lets out paper leaf 2 so that a predetermined interval may be opened between the paper leaf 2 conveyed by the conveyance mechanism section 3, between the conveyance mechanism section 3 and the delivery roller 12, being pulled by the big force can be lost, and paper leaf 2 can prevent breakage of the paper leaf 2 resulting from this etc., and can send out paper leaf 2 smoothly. And in order to free the delivery roller 12 to a driving shaft 13 by starting drawing in of the paper leaf 2 by the conveyance mechanism section 3, even if paper leaf 2 is in which position to the delivery roller 12, between the conveyance mechanism sections 3 and the delivery rollers 12 with high-speed paper leaf 2, being pulled by the big force can be lost and paper leaf 2 can always be sent out smoothly.

[0025] In addition, when drawing in of the paper leaf 2 by the conveyance mechanism section 3 is completely completed so that the above-mentioned operation may be performed, the angle between the end face 20 of the above-mentioned crevice 19 and 21, i.e., the free-rotation angle of the crevice 19 to a pin 17, will be set up so that a pin 17 may not contact at the aforementioned time in contact with the end face 21 by the side of the hand-of-cut back end. Moreover, the distance between the paper leaf 2 conveyed will be set up with the delivery speed of the delivery roller 12 and the bearer rate of the conveyance mechanism section 3 by rotation of a driving shaft 13, and the return speed of the paper leaf 2 of the separation roller 11.

[0026]

[Effect of the Invention] Even if it lets out paper leaf according to the paper leaf delivery equipment of this invention so that a predetermined interval may be opened between the paper leaf conveyed by the conveyance mechanism section as explained in full detail above, between the conveyance mechanism section and a delivery roller, being pulled by the big force can be lost, and paper leaf can prevent breakage of the paper leaf resulting from this etc., and can send out paper leaf smoothly. And in order to free a delivery roller to a driving shaft by starting drawing in of the paper leaf by the conveyance mechanism section, even if paper leaf is in which position to a delivery roller, between the conveyance mechanism sections and delivery rollers with high-speed paper leaf, being pulled by the big force can be lost and paper leaf can always be sent out smoothly.

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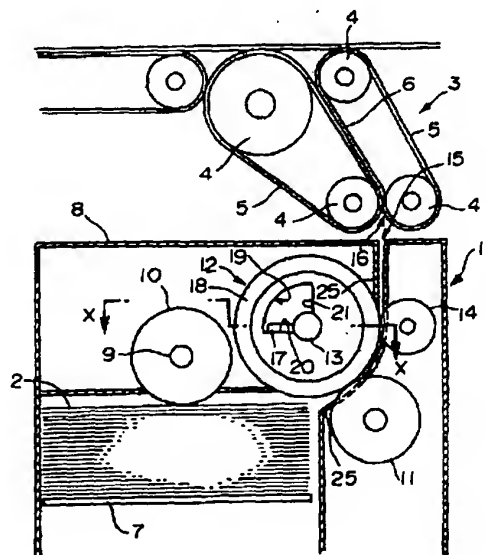
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(54)【発明の名称】 紙葉類繰出装置

(57)【要約】

【目的】 紙葉類が高速の搬送機構部と低速の繰出ローラとの間で、大きな力で引っ張られることを防止し、常に円滑に紙葉類の繰り出しを行う紙葉類繰出装置を提供することを目的とする。

【構成】 繰出ローラ12を駆動する駆動軸13に、径方向外方に突出する突出部17を設け、繰出ローラ12に、高い摩擦力を発生する高摩擦部18を外周部の全周に設けるとともに突出部17に回転方向先端側の端面20が当接することにより駆動軸13の駆動力を該繰出ローラ12に伝達し突出部17に当接しない状態においては該繰出ローラ12を駆動軸13に対して自由とする概略扇状の凹部19が形成されている。



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## 【特許請求の範囲】

【請求項1】 紙葉類を引き込んで搬送する搬送機構部の搬送方向前段に設けられ、該搬送機構部の搬送速度よりも低速で紙葉類を前記搬送機構部に繰り出す繰出ローラを有する紙葉類繰出装置において、前記繰出ローラは、駆動軸に回転自在に支持されており、該駆動軸には、径方向外方に突出する突出部が設けられ、前記繰出ローラには、高い摩擦力を発生する高摩擦部が外周部の全周に設けられるとともに、前記突出部に回転方向先端側の端面が当接することにより前記駆動軸の駆動力を該繰出ローラに伝達し前記突出部に当接しない状態においては該繰出ローラを駆動軸に対して自由とする概略扇状の凹部が形成されていることを特徴とする紙葉類繰出装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、集積された紙葉類を一枚ずつ分離して繰り出す紙葉類繰出装置に関する。

## 【0002】

【従来の技術】紙幣等の紙葉類の計数、鑑別等の処理を行うため、紙葉類が集積収納された収納部から該紙葉類を一枚ずつ取り出して、搬送方向後段に設けられた、紙葉類を搬送する搬送機構部に繰り出す紙葉類繰出装置として、実開昭63-77929号公報に開示されたものがある。この紙葉類繰出装置は、外周部の一部に高い摩擦力を発生する高摩擦部が設けられた繰出ローラを有しており、この繰出ローラの高摩擦部で紙葉類を後段の搬送機構部に繰り出すようになっている。

【0003】ところで、紙葉類の正確な鑑別処理や振分処理を行うために、搬送機構部により搬送される紙葉類間に間隔をあけて搬送する必要がある。搬送機構部の搬送速度を、紙葉類繰出装置の繰出ローラの繰出速度より高速にして、後続紙葉類から先行紙葉類を引き離す方法が採用されている。上述した従来の紙葉類繰出装置においても、高摩擦部の範囲を、紙葉類を搬送機構部の搬送力がかかるまで繰り出すように設定し、搬送機構部の搬送力が紙葉類にかかった時点で、繰出ローラの高摩擦部より摩擦力の低い部分が紙葉類に接触するようにして、紙葉類を円滑に搬送機構部により高速搬送させることによって、紙葉類間に間隔を設けることができる。

## 【0004】

【発明が解決しようとする課題】しかしながら、上記紙葉類繰出装置の場合、繰出ローラの高摩擦部と紙葉類との位置関係がずれてしまうと、紙葉類の先端が搬送機構部に送り込まれたにもかかわらずその後端側が繰出ローラの高摩擦部に接触した状態が生じ、紙葉類が高速の搬送機構部と低速の繰出ローラとの間で、大きな力で引っ張られ、これにより紙葉類に傷がついたり、破損が生じ

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てしまうという問題が生じた。

【0005】したがって、本発明の目的は、紙葉類が高速の搬送機構部と低速の繰出ローラとの間で、大きな力で引っ張られることを防止し、常に円滑に紙葉類の繰り出しを行うことができる紙葉類繰出装置を提供することである。

## 【0006】

【課題を解決するための手段】上記目的を達成するために、本発明の紙葉類繰出装置は、紙葉類を引き込んで搬送する搬送機構部の搬送方向前段に設けられ、該搬送機構部の搬送速度よりも低速で紙葉類を前記搬送機構部に繰り出す繰出ローラを有するものであって、前記繰出ローラは、駆動軸に回転自在に支持されており、該駆動軸には、径方向外方に突出する突出部が設けられ、前記繰出ローラには、高い摩擦力を発生する高摩擦部が外周部の全周に設けられるとともに、前記突出部に回転方向先端側の端面が当接することにより前記駆動軸の駆動力を該繰出ローラに伝達し前記突出部に当接しない状態においては該繰出ローラを駆動軸に対して自由とする概略扇状の凹部が形成されていることを特徴としている。

## 【0007】

【作用】本発明の紙葉類繰出装置によれば、駆動軸の突出部が、繰出ローラの凹部の回転方向先端側に当接した状態で駆動軸の駆動力を繰出ローラに伝達してこれを回転させ、これにより繰出ローラの全周に設けられた高摩擦部が紙葉類を搬送機構部側に繰り出すことになる。そして、紙葉類の先端が搬送機構部に入ると、搬送機構部の搬送速度は繰出ローラの繰出速度よりも高速となっているため、搬送機構部が高速で紙葉類を引き込むことになる。ここで、繰出ローラには突出部に当接しない状態においては該繰出ローラを駆動軸に対して自由とする概略扇状の凹部が形成されており、上記搬送機構部による紙葉類の引き込みの方向は凹部を突出部から離間させる方向であるので、搬送機構部が紙葉類を高速で引き込むことにより、繰出ローラは駆動軸の回転速度より速い、搬送機構部の搬送速度と同じ搬送速度をなして回転することになり、搬送機構部により搬送される紙葉類間に所定の間隔をあけるよう紙葉類を繰り出しても、紙葉類が高速の搬送機構部と繰出ローラとの間で、大きな力で引っ張られることがない。しかも、搬送機構部による紙葉類の引き込みが開始されることによって繰出ローラを駆動軸に対して自由とするため、繰出ローラに対して紙葉類がどの位置にあっても、紙葉類が高速の搬送機構部と繰出ローラとの間で、大きな力で引っ張られることがない。

## 【0008】

【実施例】本発明の一実施例による紙葉類繰出装置を図面を参照して以下に説明する。図中符号1は本実施例の紙葉類繰出装置を示しており、この紙葉類繰出装置は、紙幣等の紙葉類2を引き込んで搬送する搬送機構部



3の搬送方向前段に設けられている。ここで、搬送機構部3は、ブリー4間に巻回された搬送ベルト5を一對有しており、一方の搬送ベルト5のみが図示せぬモータにより駆動され、この駆動により他方が直接的または間接的（紙葉類2を介在させた状態）に連れ回りするようになっている。本実施例においては搬送ベルト5同士の接触部6が図1における左上方向に向けて移動するよう駆動されることにより紙葉類2をこの接触部6により左上方向に搬送し、その後左方向に搬送するようになっている。

【0009】紙葉類繰出装置1は、紙葉類2が集積状態で搭載される昇降自在のエレベータ7がケーシング8内に設けられており、このエレベータ7の上昇方向側には、支持軸9に固定支持された蹴出ローラ10が設けられている。ここで、エレベータ7は、集積された紙葉類2の最も上側に位置するものを常に蹴出ローラ10に所定の接触力をもって接触させるべく昇降するようになっている。

【0010】蹴出ローラ10の外周下端位置の回転方向（図1における反時計回り方向）先端側の接線上の所定位置には分離ローラ11が設けられており、この分離ローラ11の、蹴出ローラ10側の側面所定位置には繰出ローラ12が、その外周面を該分離ローラ11の外周面に所定の接触力で接触させるよう駆動軸13に支持されている。また分離ローラ11の上側所定位置には従動ローラ14が、その外周面を繰出ローラ12の外周面に所定の接触力で接触させるよう設けられており、この従動ローラ14は、繰出ローラ12の駆動により直接的あるいは紙葉類2を介在させて間接的に連れ回りするものである。そして、繰出ローラ12と従動ローラ14との接触位置の上方には、ケーシング8の開口部15が設けられ、該開口部15に対向して、上記搬送機構部3の、紙葉類2を引き込む引込部16が配置されている。

【0011】上記駆動軸13は、図示せぬ駆動モータにより図1における反時計回り方向に回転駆動されるもので、その所定位置には、径方向外方に突出する、突出部であるピン17が固定されている。

【0012】繰出ローラ12は、駆動軸13の所定位置に回転自在に支持されており、その外周部に紙葉類2との間に所定の高摩擦力を発生させる、例えばゴム材等からなる高摩擦部18が全周に固着されている。また、繰出ローラ12の図1における手前側の一側面には、駆動軸13を中心に概略扇状をなす凹部19が形成されており、この凹部19内に上記ピン17が位置している。これにより、凹部19はその両端面20、21間にピン17が位置する範囲で駆動軸13に対して自由に回転できるようにしており、ピン17が凹部19の回転方向先端側の端面20に当接した状態において駆動軸13の駆動力が伝達され該駆動軸13と一体に回転するようになっている。

【0013】蹴出ローラ10は、繰出ローラ12の回転に連動して回転駆動されるようになっている。すなわち、図2に示すように、繰出ローラ12には、ブリー22が固定されており、また蹴出ローラ10にもブリー23が固定されていて、これらブリー22、23間にはベルト24が巻回されているため、駆動軸13が回転しピン17が凹部19の回転方向先端側の端面20に当接して繰出ローラ12が回転するとベルト24によりその駆動力が伝達されて蹴出ローラ10は回転する。

【0014】分離ローラ11は、蹴出ローラ10から蹴り出された紙葉類2を分離するためのものであり、繰出ローラ12の高摩擦部18と紙葉類2との摩擦より小さくかつ紙葉類2同士の摩擦より大きい摩擦力を紙葉類2との間で発生させることができる例えばゴム等の材料から形成されていて、繰出動作時に、上記繰出ローラ12と同方向（図1における反時計回り方向）に回転駆動されるようになっている。そして、二重送り等が発生した場合に、重なり合う紙葉類2間の摩擦力は繰出ローラ12とこれに接触する紙葉類2との摩擦より小さいため、繰出ローラ12に接触する紙葉類2は繰出ローラ12の駆動力によって搬送方向に沿って送られ、分離ローラ11に接触している紙葉類2は分離ローラ11の駆動力によってエレベータ7側に戻されることになる。なお、ケーシング8には蹴出ローラ10から蹴り出された紙葉類2の先端を、繰出ローラ12と分離ローラ11との間に導き、繰出ローラ12と従動ローラ14との間を通過させ、開口部15に導くためのガイド25が設けられている。

【0015】なお、繰出ローラ12と従動ローラ14との接線方向の速度が紙葉類2の繰出速度になり、搬送機構部3の搬送ベルト5の接触部6の移動速度が搬送速度となっていて、繰出速度は、搬送速度よりも繰り出された紙葉類2間に設ける所定の間隔に応じた分低速に設定されている。

【0016】以上のような構成の本実施例の紙葉類繰出装置1の作動について以下に順を追って説明する。

【0017】紙葉類2を繰り出すべく指令が出されると、搬送機構部3が所定の搬送方向に駆動され、紙葉類繰出装置1の駆動軸13が繰出方向（図1における反時計回り方向）、分離ローラ11が反繰出方向（図1における反時計回り方向）に回転駆動されることになる。

【0018】駆動軸13が駆動されると該駆動軸13に固定されたピン17が、繰出ローラ12の凹部19の回転方向先端側の端面20に当接し、これにより繰出ローラ12が駆動軸13と一体に回転する。一方、この繰出ローラ12の回転によりこれにベルト24を介して連結された蹴出ローラ10が繰出方向に所定の蹴出速度で回転駆動されることになる。

【0019】この蹴出ローラ10の回転によりエレベータ7上に集積された紙葉類2の最も上側に位置するもの

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が繰出ローラ12と分離ローラ11との間にその先端がガイド25により導かれて挿入されることになる(図3に示す状態)。

【0020】さらに駆動軸13が回転すると、紙葉類2は、繰出ローラ12と分離ローラ11との間を繰出ローラ12の高摩擦部18に接触しつつ繰出方向に、ほぼ滑りなく移動し、その先端が繰出ローラ12と従動ローラ14との間を通過した後、開口部15から突出して搬送機構部3の引込部16に至り(図4に示す状態)搬送機構部3の両搬送ベルト5間の接触部6により引き込みが

開始される。  
【0021】上記搬送機構部3の搬送速度は、繰出ローラ12と従動ローラ14の繰出速度よりも高速となっているため、搬送機構部3が高速で紙葉類2を引き込むことになる。ここで、繰出ローラ12にはピン17に当接しない状態においては該繰出ローラ12を駆動軸13に対して自由とする凹部19が形成されており、上記搬送機構部3による紙葉類2の引き込みの方向は凹部19をピン17から離間させる方向であるので、搬送機構部3が紙葉類2を高速で引き込むことにより、繰出ローラ12は紙葉類2の移動で、駆動軸13の回転速度より速い、搬送機構部3の搬送速度と同じ速度をなして回転する(図5に示す状態)。

【0022】そして、上記紙葉類2が繰出ローラ12および従動ローラ14から搬送機構部3側に離れると、繰出ローラ12は、これを紙葉類2の繰出方向側に回転させる力が作用しなくなる。このとき次の紙葉類2aは、蹴出ローラ10による蹴り出しの最中で、すでに繰出ローラ12と従動ローラ14との間にその先端が送り込まれた状態にあるが、分離ローラ11の回転により、繰出ローラ12を繰出方向に対して逆方向に回転させつつ、繰出方向に対し逆方向に所定量戻される。なお、繰出ローラ12が逆回転する際には、これに連動する蹴出ローラ10も逆回転することになって、次の紙葉類2aは良好に戻されることになる。

【0023】上記繰出ローラ12の逆回転と、回転が継続されている駆動軸13のピン17の端面20側への移動とにより、ピン17が端面20に当接すると(図6に示す状態)、該駆動軸13からの駆動力が繰出ローラ12に再度伝わって、該繰出ローラ12が繰出方向側に回転し、次の紙葉類2aの繰り出しを行うことになる(図7に示す状態)。そして、上記のように、繰出ローラ12が逆回転した後、次の紙葉類2aの搬送機構部3へ繰り出しが行われる間に、既に搬送機構部3により引き込まれた紙葉類2は、高速搬送されているため、これにより、既に搬送機構部3側に繰り出された紙葉類2と、次に繰り出される紙葉類2aとの間に所定の間隔がかけられることになる。

【0024】以上により、搬送機構部3により搬送される紙葉類2間に所定の間隔をあげるよう紙葉類2を繰り

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出しても、紙葉類2が搬送機構部3と繰出ローラ12との間で、大きな力で引っ張られることがなくなり、これに起因する紙葉類2の破損等を防止し、円滑に紙葉類2の繰り出しを行うことができる。しかも、搬送機構部3による紙葉類2の引き込みが開始されることによって繰出ローラ12を駆動軸13に対して自由とするため、繰出ローラ12に対して紙葉類2がどの位置にあっても、紙葉類2が高速の搬送機構部3と繰出ローラ12との間で、大きな力で引っ張られることがなくなり、常に円滑に紙葉類2の繰り出しを行うことができる。

【0025】なお、上記凹部19の端面20、21間の角度すなわちピン17に対する凹部19の自由回転角度は、上記作動を行うように、搬送機構部3による紙葉類2の引き込みが完全に完了する時点においてピン17が回転方向後端側の端面21に当接するか、または前記時点においても当接しないように設定されることになる。また、搬送される紙葉類2間の距離は、駆動軸13の回転による繰出ローラ12の繰出速度と搬送機構部3の搬送速度と分離ローラ11の紙葉類2の戻し速度とにより設定されることになる。

【0026】

【発明の効果】以上詳述したように、本発明の紙葉類繰出装置によれば、搬送機構部により搬送される紙葉類間に所定の間隔をあげるよう紙葉類を繰り出しても、紙葉類が搬送機構部と繰出ローラとの間で、大きな力で引っ張られることがなくなり、これに起因する紙葉類の破損等を防止し、円滑に紙葉類の繰り出しを行うことができる。しかも、搬送機構部による紙葉類の引き込みが開始されることによって繰出ローラを駆動軸に対して自由とするため、繰出ローラに対して紙葉類がどの位置にあっても、紙葉類が高速の搬送機構部と繰出ローラとの間で、大きな力で引っ張られることがなくなり、常に円滑に紙葉類の繰り出しを行うことができる。

【図面の簡単な説明】

【図1】本発明の一実施例による紙葉類繰出装置を示す正断面図である。

【図2】本発明の一実施例による紙葉類繰出装置の繰出ローラおよび蹴出ローラ等を示す、図1におけるX-X線に沿う断面図である。

【図3】本発明の一実施例による紙葉類繰出装置の、紙葉類が蹴出ローラにより蹴り出される状態を示す正断面図である。

【図4】本発明の一実施例による紙葉類繰出装置の、紙葉類が繰出ローラにより繰り出され搬送機構部により引き込まれる前の状態を示す正断面図である。

【図5】本発明の一実施例による紙葉類繰出装置の、紙葉類が搬送機構部により繰出ローラ側から引き込まれた状態を示す正断面図である。

【図6】本発明の一実施例による紙葉類繰出装置の、紙葉類が繰出ローラ側から離れた後の状態を示す正断面図

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である。

【図7】本発明の一実施例による紙葉類繰出装置の、次の紙葉類が繰出ローラにより繰り出され搬送機構部により引き込まれる前の状態を示す正断面図である。

【符号の説明】

1 紙葉類繰出装置

2 紙葉類

\* 3 搬送機構部

12 繰出ローラ

13 駆動軸

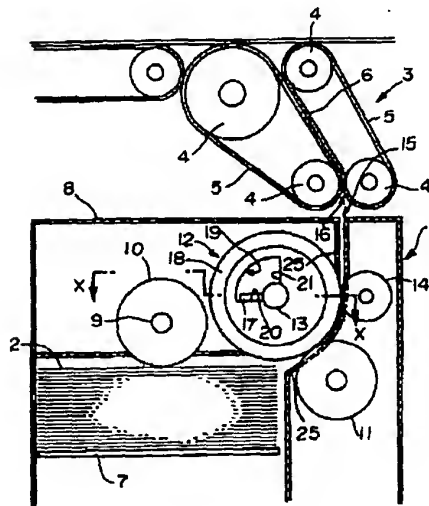
17 ピン (突出部)

18 高摩擦部

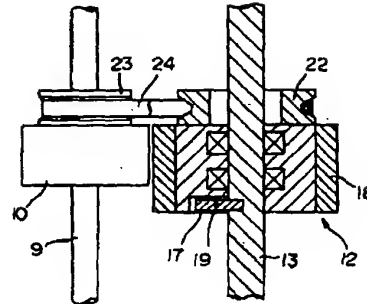
19 凹部

\* 20 端面

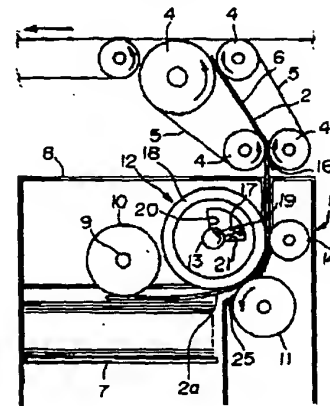
【図1】



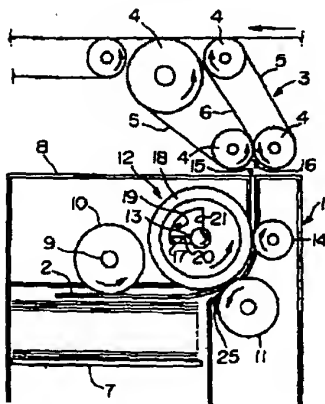
【図2】



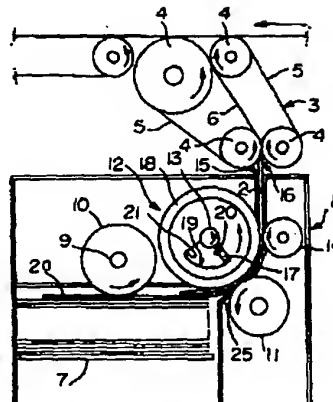
【図5】



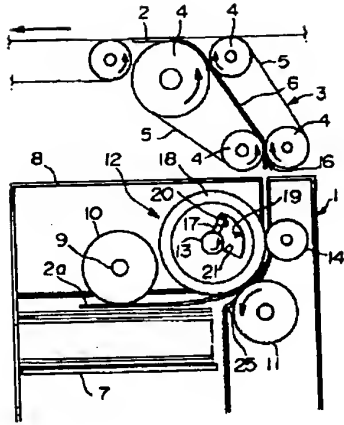
【図3】



【図4】



【図6】



【図7】

